

REMARKS

The Official Action dated August 27 2004, has been carefully considered. Accordingly, the changes and remarks presented herewith are believed sufficient to place the present invention in condition for allowance. Reconsideration is respectfully requested.

Claims 1-28 and 30 have been cancelled and claims 31-68 have been added. Support for claims 31-68 can be found in original claims 1-30. Since this amendment does not involve any introduction of new matter, entry is believed to be in order and is respectfully requested.

In the Official Action, the Examiner objected to claims 5, 6, 7, 8, 21, 22, 23, 24, 26 and 27 for informalities. The Examiner asserted that the claims were confusing due to "preferred" ranges contained in the claims. Claims 1-28 and 30 have been cancelled, thereby mooting the Examiner's objection. Moreover, the presently amended claims do not contain such informalities. Reconsideration is respectfully requested.

In the Official Action, claims 1-28 and 30 were rejected under 35 U.S.C. § 102(a) as being anticipated by WO 99/20705 (hereafter "WO '705"). The Examiner asserted that WO '705 teaches a method of treating a metal surface which may be steel or aluminum coated with rubber by applying a solution to the substrate, said solution comprising at least one organofunctional silane and a non-organofunctional silane both at least partially hydrolysed, with a pH of about 4 and concentrations of 0.5 - 10% in an aqueous solution free of other acids. Claims 1-28 and 30 have been cancelled, thereby mooting the Examiner's rejection. Reconsideration is respectfully requested.

Moreover, Applicants believe that the newly added claims 31-68 are patentable and not anticipated by WO '705. Claim 31 is directed to a method of treating a metal substrate. The method comprises the steps of :

- (a) providing a metal substrate; and
- (b) applying an aqueous solution to said metal substrate, said solution comprising:

(i) at least one acyloxy silane, wherein said acyloxy silane comprises at least one acyloxy group, and wherein said acyloxy silane has been at least partially hydrolysed and is either

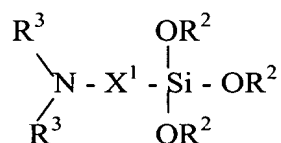
(A) a single tetrasubstituted silicon atom wherein the substituents are individually selected from the group consisting of alkyl, alkenyl, alkynyl, aryl, alkaryl, aralkyl, vinyl, amino, ureido, glycidoxy, epoxy, hydroxy, alkoxy, aryloxy, acyloxy, and any of the group alkyl, alkenyl, alkynyl, aryl, alkaryl and aralkyl substituted by a group selected from the group consisting of vinyl, amine, ureido, glycidoxy, epoxy, hydroxy and alkoxy, with the proviso that at least one of the substituents on the silicon atom is an acyloxy group; or

(B) a multisilyl acyloxy silane;

and

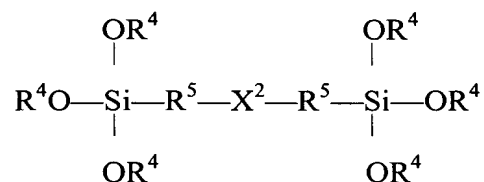
(ii) at least one basic silane compound which is selected from the group consisting of

(A) compounds having the general structure



wherein R^2 is chosen from the group consisting of hydrogen and $\text{C}_1\text{-C}_{24}$ alkyl, and each R^2 may be the same or different; X^1 is selected from the group consisting of a bond, substituted and unsubstituted aliphatic groups and substituted and unsubstituted aromatic groups; and R^3 is a group individually selected from the group consisting of hydrogen, $\text{C}_1\text{-C}_6$ alkyl, $\text{C}_2\text{-C}_6$ alkenyl, $\text{C}_1\text{-C}_6$ alkyl substituted with at least one amino group, $\text{C}_2\text{-C}_6$ alkenyl substituted with at least one amino group, arylene and alkylarylene; and

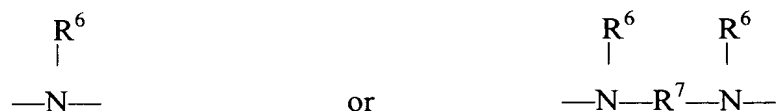
(B) a bis-silyl aminosilane(s) having the structure



wherein R^4 is individually selected from the group consisting of: hydrogen and $\text{C}_1 - \text{C}_{24}$ alkyl;

R⁵ is individually selected from the group consisting of: substituted aliphatic groups, unsubstituted aliphatic groups, substituted aromatic groups, and unsubstituted aromatic groups; and

-X² is either:



wherein each R⁶ is individually selected from the group consisting of: hydrogen, substituted and unsubstituted aliphatic groups, and substituted and unsubstituted aromatic groups; and R⁷ is selected from the group consisting of: substituted and unsubstituted aliphatic groups, and substituted and unsubstituted aromatic groups;

wherein the acyloxy silane and the basic silane compound are present in concentrations to provide a solution pH of between 3 and 10 and wherein the solution is substantially free of acid other than acid produced upon hydrolysis of the acyloxy silane.

WO '705 discloses a method of adhering a metal substrate to a rubber substrate in which the adhesive treatment comprises a mixture of organofunctional silane and a non-organofunctional silane. The WO '705 reference discloses a list of non-organofunctional silanes that includes 1,2 bis (trimethoxysilylpropyl) amine. The list of non-organofunctional silanes of the WO '705 reference is not limited to acyloxy silanes. The WO '705 reference lists vinyltriethoxy silane as a possible compound for organofunctional silanes. However, the list of organofunctional silanes in WO '705 is not limited to basic compounds. In addition, WO '705 fails to disclose the specific combination of the present invention. The presence of acyloxy silanes is an essential feature of the present invention. The presence of acyloxy silanes results in an acidic solution and advantageously no production of volatile organic compounds (VOCs). WO '705 fails to disclose a single example in which acyloxy silanes are utilized, particularly in combination with a basic silane compound of the structure specified in the claims as amended herein.

While the use of acyloxy silanes is beneficial in many respects, it results in very low pH's which can result in condensation of hydrolysed acyloxy silanes. As discussed in the present specification at page 7, it is necessary to add a base to maintain the pH in an optimal range. The present invention, as defined in the amended claims, utilizes a basic silane compound which eliminates the need to add a further pH adjustment compound.

Although the WO '705 reference discusses control of the solution pH, the Examiner's attention is directed to pages 4, line 25 - page 5, line 2 of the WO '705 reference. The WO '705 reference discloses using an acidic compound as a pH adjustment agent, preferably acetic acid.

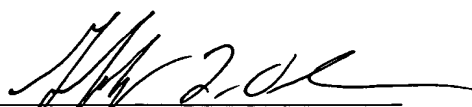
To anticipate, every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim. *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383, 58 U.S.P.Q.2d 1286, 1291 (Fed. Cir. 2001); *Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565, 1576, 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991). Further, the reference must describe the Applicant's claimed invention sufficiently to place a person of ordinary skill in the field of the invention in possession of it. *Akzo N.V. v. United States Int'l Trade Comm'n*, 808 F.2d 1471, 1479, 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986), *cert denied*, 482 U.S. 909 (1987); *In re Coker*, 463 F.2d 1344, 1348, 175 U.S.P.Q. 26, 29 (CCPA 1972).

Applicants find no teaching or suggestion of using a basic silane compound in combination with an acyloxy silane in an aqueous solution for treating a metal surface. On the contrary, the WO '705 references explicitly teaches away from using a basic silane compound by its teaching of using an acidic compound to adjust the pH of the solution. As such, Applicants believe that a person of ordinary skill in the art would have been directed away from the inclusion of a basic silane compound in the aqueous solution based on the teachings of the WO '705 reference. Accordingly, the WO '705 reference does not anticipate

the presently claimed methods and solutions. Whereby, the rejection has been overcome and reconsideration is respectfully requested.

It is believed that the above represents a complete response to the Examiner's objections and rejections under 35 U.S.C. §102 and places the present invention in condition for allowance. Reconsideration and an early allowance are respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'G. Oberhaus', is written over a horizontal line.

Geoffrey L. Oberhaus
Registration No. 42,955
Dinsmore & Shohl LLP
1900 Chemed Center
255 East Fifth Street
Cincinnati, Ohio 45202
(513) 977-8623

1075201_1.DOC